

a substantially relaxed SiGe layer present atop the insulating region, wherein the substantially relaxed SiGe layer has a thickness of about 2000 nm or less; and a strained Si layer formed atop the substantially relaxed SiGe layer.

- 5 Other aspects of the present invention relate to superlattice structures as well as templates for other lattice mismatched structures which include at least the SiGe-on-insulator substrate material of the present invention.

Brief Description of the Drawings

- 10 FIGS 1A-1D are pictorial representations (through cross-sectional views) showing the basic processing steps that are employed in the present invention in fabricating a thin, high-quality, substantially relaxed SiGe-on-insulator substrate material wherein the initial substrate includes an unpatterned diffusion barrier region.
- 15 FIGS 2A-²D are pictorial representations (through cross-sectional views) showing the basic processing steps that are employed in an alternative embodiment of the present invention in fabricating a thin, high-quality, substantially relaxed SiGe-on-insulator substrate material wherein the initial substrate includes a patterned diffusion barrier region.
- 20 FIGS 3A-3B are pictorial representations (through cross-sectional views) showing an alternative embodiment of the present invention wherein a Si cap layer is formed atop a Ge or SiGe layer which is formed on an unpatterned (3A) or patterned (3B) substrate.
- 25 FIGS 4A-4B are pictorial representations (through cross-sectional views) showing the formation of a strained Si layer on the thin, high-quality, substantially relaxed SiGe-on-insulator substrate material of FIGS 1D and 2D, respectively.